Baskett Slough National Wildlife Refuge
Waterfowl Hunt Program
Supplemental Environmental Assessment

Analysis tiered from the
Willamette Valley National Wildlife Refuges
Final Comprehensive Conservation Plan and Environmental Assessment
of September 2011

With minor modifications per revised hunt areas

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Chapter 1. Purpose and Need

Introduction and Background

The Willamette Valley National Wildlife Refuge Complex, consisting of Ankeny National Wildlife Refuge, Baskett Slough National Wildlife Refuge and William L. Finley National Wildlife Refuge, was created in the 1960s primarily for the benefit of wintering dusky Canada geese and other migratory waterfowl and birds. The three refuges that comprise the Complex are spread north to south through the Willamette Valley (Map 1) with the northernmost being Baskett Slough NWR located near Salem; Ankeny NWR located near Jefferson; and William L. Finley NWR to the south of Corvallis.

In September 2011 the U.S. Fish and Wildlife Service (Service) adopted a Comprehensive Conservation Plan for Ankeny, Baskett Slough, and William L. Finley National Wildlife Refuges. The CCP was adopted for implementation after developing a Comprehensive Conservation Plan and Environmental Assessment (CCP/EA) for the three Refuges. This CCP/EA evaluated three management options (alternatives) for the CCP and disclosed anticipated effects for each alternative, pursuant to the National Environmental Policy Act of 1969 (NEPA), as amended (42 U.S.C. 4321-4347). Appendices provided supporting information. The CCP/EA was available for public comment and review from May 25, 2011 through June 30, 2011. After evaluating comments received on the CCP/EA and responding to public comments, the Service adopted Alternative 2 in the CCP/EA, which had been identified as the Service's Preferred Alternative, for implementation.

The goals, objectives, and strategies under Alternative 2 were determined to best achieve the purpose and need for the CCP while maintaining balance among the varied management needs and programs. Alternative 2 addressed the issues and relevant mandates, and is consistent with principles of sound fish and wildlife management.

The CCP sets forth management guidance for the Refuges over the next 15 years, as required by the National Wildlife Refuge System Administration Act of 1966 (16 U.S.C. 688dd -688ee, as amended by the National Wildlife Refuge System Improvement Act of 1997). The Improvement Act mandated that CCPs be developed for all refuges in the National Wildlife Refuge System.

As part of setting forth future management guidance, the CCP and accompanying hunt plan introduced and evaluated establishing an early goose hunt and youth waterfowl hunting program at Baskett Slough National Wildlife Refuge (Baskett Slough Refuge).

This Supplemental EA modifies the areas that may be available for the early goose and youth waterfowl and hunts. The analysis is tiered from the CCP.

Purpose and Need for the Action

The purpose of the CCP was to provide reasonable, scientifically-grounded guidance for ensuring that over the next fifteen years, the refuges. With regard to the hunt, two particular elements are relevant:

- Maintain areas to contribute to healthy, viable wintering Canada goose populations (especially dusky Canada geese) in the Willamette Valley while minimizing depredation on

private agricultural lands in the Valley;
- Provide compatible wildlife-dependent recreation opportunities for visitors, fostering an appreciation and understanding of the refuges' fish, wildlife, plants, and their habitats;

The CCP established the management direction for these three refuges; primary among these are the appropriate role of these refuges within the context of the entire Lower Columbia/Willamette Valley wintering Canada goose area and to ensure that the refuges continue to provide plentiful and reliable forage supplies for the goose population and minimal disturbance during the wintering period.

The CCP also analyzed the refuges' public-use programs to ensure that adequate consideration of the "Big Six" Refuge System wildlife-dependent uses (wildlife observation, wildlife/nature photography, environmental education, interpretation, hunting, and fishing) had occurred. In addition, the CCP identified improvements or alterations to be made to the current programs and services offered to Refuge visitors, especially in light of a growing regional population, changing demographics, desired outcomes for visitor experiences, and new compatibility requirements.

Waterfowl Hunting Program at Baskett Slough Refuge

As part of the effort to provide improved programs under the CCP/EA, the Service determined an early season goose hunt and a youth waterfowl hunt could be established at Baskett Slough Refuge which is safe and compatible with refuge purposes and National Wildlife Refuge System mission.

The key parameters include:

- Youth hunt one weekend/year in September at up to five designated hunt sites in cropfields and wetlands.
- September goose hunt two weekends/year at up to ten designated hunt sites in cropfields and wetlands.

Providing waterfowl hunting opportunity at Baskett Slough Refuge helps to better provide a Big Six use, which is currently not provided at any of the Willamette Valley Refuges. Providing opportunities for youth is an important initiative in the Fish and Wildlife Service and helps address a public desire to see more hunting opportunities for youth. The September goose hunt would focus harvest on Western Canada geese, which are currently above population objectives in the Flyway. Duskys would not be impacted as they arrive later in the fall. These hunts are proposed at Baskett Slough because this Refuge has a fairly reliable supply of water at that time of year and a history of Western Canada goose presence in September.

Within the CCP/EA, a Hunt Plan (Appendix G) addressed the early goose hunt and youth waterfowl hunts planned for Baskett Slough Refuge and developed a compatibility determination (Appendix B) which concluded that establishing a waterfowl hunt program as described in this hunt plan would not materially interfere with or detract from achieving refuge purposes and National Wildlife Refuge System Mission.

Detailed descriptions of Baskett Slough Refuge waterfowl hunting program and the environmental effects associated with providing waterfowl hunting opportunities at Baskett Slough Refuge were described in the hunt plan, the compatibility determination, in the rational for changing the deer

hunting in Refuge Objective 10f (CCP/EA Chapter 2), and in the Environmental Consequences Chapter (Chapter 6) of the CCP/EA.

This document, tiered from the Final CCP/EA (September 2011), has been developed to consolidate the information pertaining to waterfowl hunting opportunities at Baskett Slough Refuge in an effort to provide reviewers a more succinct evaluation and analysis of the effects on the human environment associated with waterfowl hunting opportunities at Baskett Slough Refuge. In addition, since the publication of the Final CCP/EA, the areas that will be available to conduct waterfowl hunting have been slightly changed. Maps in this document display the potential new areas available for hunting.

Chapter 2. Alternatives

This chapter describes the alternatives considered in response to requests for additional waterfowl hunting opportunities at the Willamette Valley Refuge, and waterfowl program at Baskett Slough Refuge as adopted under the CCP.

Conformance with Statutory Objectives

Baskett Slough National Wildlife Refuge was established under, or to fulfill the purpose of, the Migratory Bird Conservation Act (16 U.S.C. §715a-715r), or through approval of the Migratory Bird Conservation Committee, as an "inviolate sanctuary for migratory birds, or for any other management purpose, for migratory birds." On units of the Refuge System, or portions thereof established as an "inviolate sanctuary," the Service may only allow hunting of migratory game birds on no more than 40 percent of that Refuge, or portion, at any one time unless the Service finds that taking of any such species in more than 40 percent of such area would be beneficial to the species (National Wildlife Refuge Administration Act (16 U.S.C. §668dd(d)(1)(A)); MBTA (16 U.S.C. §703-712); Migratory Bird Conservation Act (16 U.S.C. §715a-715r)).

Any use of a national wildlife refuge must be compatible with resource protection and conform to applicable laws, regulations, and Service policies. Recreational use, in this case hunting, is allowed under the Refuge Recreation Act of 1962 (16 U.S.C. 460K, amended), which authorizes the Secretary of the Interior to administer refuges, hatcheries, and other conservation areas for recreational use. The Refuge Recreation Act requires: 1) that any recreational use permitted will not interfere with the primary purpose for which the refuge was established; and 2) that funds are available for the development, operation, and maintenance of the permitted forms of recreation.

Likewise, statutory authority for Service management and associated habitat/wildlife management planning on units of the National Wildlife Refuge System (NWRS) is derived from the National Wildlife Refuge System Administration Act of 1966, as amended by the National Wildlife Refuge System Improvement Act of 1997 (16 U.S.C. 668dd-668ee). The National Wildlife Refuge System Improvement Act provided a mission for the NWRS and clear standards for its management, use, planning, and growth. The National Wildlife Refuge System Improvement Act recognizes that wildlife-dependent recreational uses—hunting, fishing, wildlife observation and photography, environmental education, and interpretation—when determined to be compatible with the mission of the NWRS and the purposes of the refuge—are legitimate and appropriate public uses of National Wildlife Refuges. Sections 5(c) and (d) of the National Wildlife Refuge System Improvement Act states "compatible wildlife-dependent recreational uses are the priority general public uses of the NWRS and shall receive priority consideration in planning and management; and when the Secretary [of the Interior] determines that a proposed wildlife-dependent recreational use is a compatible use within a refuge, that activity should be facilitated, subject to such restrictions or regulations as may be necessary, reasonable, and appropriate."

Alternatives Considered

Background

During the winter of 1985-86, crop depredation on adjacent private lands was significant (most significant in the William L. Finley and Baskett Slough Refuge areas), resulting in considerable media coverage. Numerous meetings with farmers, the National Farm Bureau, Oregon Farm Bureau, congressional delegations, state entities, and others were held. Local recommendations were to increase food crops on the refuges, modify the types of crops grown, and to maintain the closure of

William L. Finley NWR and Baskett Slough NWR to all waterfowl hunting, thereby encouraging geese to stay on the refuges.

Ankeny NWR was opened to waterfowl hunting in 1986 under a state quota system but was closed to waterfowl hunting in 1988 due to the continued low dusky goose populations and increased crop depredation problems on adjacent private lands. All three refuges have remained closed to waterfowl hunting since that time. The waterfowl hunting closure on all of the Willamette Valley national wildlife refuges has continued since that time in order to provide undisturbed sanctuary areas for wintering Canada geese.

During the acquisition of the Snag Boat Bend Unit, it was determined that waterfowl hunting would not be allowed on the property above the ordinary high-water line of the Willamette River or from non-navigable waters. Waterfowl hunting would still continue below the ordinary high-water line of the Willamette River but would not be allowed above it in order to avoid conflicts with non-consumptive use programs that are occurring such as wildlife observation and photography.

Current Alternatives (Same as Range of Alternatives Considered in the CCP)
Alternative 1: No action. No waterfowl hunting
Alternative 2: Limited waterfowl hunting as described in the attached Waterfowl Hunt Plan and summarized below.
Alternative 3: No waterfowl hunting

Alternatives Considered during CCP Development
During the CCP public involvement process, the Service received numerous requests to provide waterfowl hunting opportunities. In response to requests to provide additional waterfowl hunting opportunities at the Willamette Valley Refuges, the Service evaluated the feasibility of establishing waterfowl hunting at all three refuges and determined an early season goose hunt and a youth waterfowl hunt could be established at Baskett Slough Refuge which is safe and compatible with refuge purposes and National Wildlife Refuge System mission.

Neither the youth hunt nor the September goose hunt was considered feasible for W.L. Finley or Ankeny because of minimal habitat during the seasons of interest, minimal September populations of Western Canada geese, potential conflicts with non-consumptive uses, and/or conflicts with other wildlife.

A hunt is not proposed on the Refuges during the winter season because of the potential to impact duskys and other wintering geese and conflicts with the Refuges' purposes. A duck hunting season short of the full season was considered (i.e., during October) but due to limited habitat in the early fall and the fact that duck populations are low until precipitation increases in November, a hunt is not feasible at this time. Once adequate precipitation occurs and viable duck populations are present, duskys and other wintering geese are present in high numbers and concern with disturbance then outweighs other considerations.

Alternative 2 waterfowl hunt details

Objective 10f from the CCP/EA: Provide opportunities for quality waterfowl hunting

As described in the CCP/EA, the strategies developed to meet this objective include:

- Complete all administrative requirements for developing hunt opening package and publish Federal Register notice revising hunting areas and seasons.
- Open Baskett Slough Refuge for the September goose hunt. Based on periodic evaluation of the program, consider adding other September goose hunts at the other stations in subsequent years.
- Open Baskett Slough Refuge to a Youth Waterfowl Hunt on one weekend in September. Based on periodic evaluation of the program, consider adding other youth hunts at the other stations in subsequent years.

Description of the Waterfowl Hunt Program

The areas that would be open to waterfowl hunting on Baskett Slough refuge are shown on Map 2. As mentioned in the earlier section, the areas have been revised slightly since the CCP/EA was published. Waterfowl hunting would occur on specific wetlands and in crop fields.

Of the 2,521 acres that comprise the Refuge (GIS estimate), up to 856 acres would be open for the September goose hunt, and 498 acres for the youth waterfowl hunt. Hence, 20-34 percent of the Refuge would be open to waterfowl hunting at some time of the year. Up to 140 hunt days per year are expected to accrue in this use annually. The refuge will evaluate the number and location of hunt sites each year and make any changes or adjustments to the program each season based on these evaluations.

Table 1. Early Season Goose Hunt Proposed Program

Aspect	***Description***
Location	Baskett Slough Refuge. Hunting would be potentially allowable at Dusky, Vancouver, Cackler, Taverner's, Parvipes, and Moffitti Marshes, and some areas of adjacent fields. A maximum of 498 acres (20% of the refuge) plus not more than 358 acres of adjacent fields would be open to goose hunting in any one year for a combined maximal total of 34% of the Refuge available to hunt (See Map 2). The actual areas open in each year would be subject to water availability and management discretion. Year by year maps would be made available to the public at the Refuge and on the Complex website. *(See Map 2).*
Season	Opening weekend and closing weekend of the State September season, for a total of four open days.
Blinds	Temporary blinds may be constructed or brought in, and must be removed at the end of the day.
Fees	None
Permits	Up to ten hunt parties would be allowed with a maximum of three hunters permitted per party. Hunt parties would be required to space themselves no less than 200 yards apart from each other. Hunters would be selected through a drawing prior to the hunt dates (See section on application procedures).
Other hunt regulations	All hunters must have a valid state hunting license. Hunters 16 years of age or older must have a valid federal waterfowl stamp in possession. Hunters 14 years of age or older must have a state waterfowl validation in possession. The taking of white-fronted, Aleutian, or cackling Canada geese would be prohibited. Other hunt regulations per state (ODFW) rules apply.

Table 2. Youth Duck Hunt Proposed Program

Aspect	*Description*
Location	Baskett Slough Refuge. Hunting would be potentially allowable at Dusky, Vancouver, Cackler, Taverner's, Parvipes, and Moffitti Marshes. A maximum of 498 acres (20% of the refuge) would be open to youth duck hunting in any one year (See Map 2). The actual areas open in each year would be subject to water availability and management discretion. Year by year maps would be made available to the public at the Refuge and on the Complex website. (*See Map 2).*
Season	As designated by ODFW (usually the last weekend in September).
Blinds	Blind sites would be determined prior to the hunt by refuge staff. Hunting would be restricted to the designated blind sites.
Fees	None
Permits	Up to five designated hunt sites would be available with a maximum of two youths and one parent or guardian permitted to occupy each site. Youths would be selected through a drawing.
Other hunt regulations	Open to youths 15 years of age and younger. A parent or guardian (age 21 and above) must accompany up to two youths. The parent or guardian may not hunt. Youths participating in the hunt must have both a Hunter Education Certificate and a valid hunting license in possession. Hunters 14 years of age or older must have a state waterfowl validation in possession. All goose hunting is closed in Polk County where Baskett Slough Refuge is located during the September Youth Hunt. Other hunt regulations per state (ODFW) rules apply.

The refuge would conduct these hunts to coincide with the State early September goose season and the State youth waterfowl hunt weekend. The early goose season generally starts the first weekend in September and extends for nine to ten days. The State youth waterfowl hunt is generally scheduled during the last weekend in September. The refuge would maintain the discretion to develop the framework of these hunts within this timeframe.

The small sizes of the refuges create the need for a permit program in certain areas to avoid conflicts between hunters and potential safety issues. An established number of permits, as described below, would allow desired hunter density, so as to provide uncrowded and safe hunting conditions.

Hunter Application Procedures

Youth Duck Hunt: Youths wishing to hunt would be required to fill out and send a post card, for each of the available days they wish to hunt, with their name, address, and the words "Baskett Slough Youth Hunt" (see Hunter Selection Process).

Early Season Goose Hunt: Hunters would be required in advance to fill out and submit a post card to the refuge for each of the days they wish to hunt (see Hunter Selection Process).

Description of Hunter Selection Process

Youth Hunt: Youth hunt permits would be selected using a random drawing conducted by refuge

staff. Those selected would be notified prior to the hunt days. Those not selected would not be notified.

Early Season Goose Hunt: Hunt permits would be selected using a random drawing conducted by refuge staff. Those selected would be notified prior to the hunt days. Those not selected would not be notified.

Description of Hunter Orientation

The refuge office would serve as the check station where hunters would be required to check in and check out. Refuge staff would operate the check station and check in/check out procedures.

Hunter orientations would be provided to all duck/goose hunters daily at the Baskett Slough Youth and Early Goose Season Hunts. Check station attendants would publicly review hunt regulations and permit requirements before issuing hunt permits to advanced reservation holders for each day. The check station would open 1 ½ hours before established State shooting times each day of a hunt. Hunters would be given their permits at this time.

Hunter Requirements and Regulations

(1) Age: Federal criteria only allows hunters 15 years of age and younger to participate in the Youth Waterfowl Hunt. Youths must be accompanied by an adult 21 years of age or older.

(2) Allowable equipment (Early Season Goose and Youth Waterfowl Hunts): Blinds, decoys, and other personal property must be removed at the end of each day's hunt. Vehicles are restricted to designated public use roads and designated parking areas. Dogs are allowed for hunting ducks and geese. Toxic shot is prohibited for the early September Goose Hunt and the Youth Duck Hunt.

(3) Wearing hunter orange is required for youth hunters as per State regulations.

(4) Open fires are not allowed.

(5) License and permits: Hunting permits are required. The license requirements are those required by the State of Oregon and the Federal duck stamp for waterfowl hunting.

(6) Reporting harvest: Waterfowl and goose permit hunters must check back in to the check station at Baskett Slough.

(7) Hunter safety requirements: Goose hunters would be required to space themselves no less than 200 yards apart from each other during the early September Goose Hunt. Designated hunt sites would be established for the Youth Duck Hunt. Wearing hunter orange would be required for all youth hunters as per State regulations.

(8) No overnight camping or after-hours parking is permitted on the refuges.

(9) No hunting is permitted from refuge structures, observation blinds, boardwalks, etc.

(10) All vehicles must remain parked in designated areas.

(11) Persons possessing, transporting, or carrying firearms on national wildlife refuges must comply

with all provisions of State and local laws. Persons may only use (discharge) firearms in accordance with refuge regulations (50 CFR 27.42 and specific refuge regulations in Part 32).

Chapter 3. Affected Environment

This chapter describes the habitat types and representative plant and animal species which could potentially be affected by allowing the early season goose hunt and youth waterfowl hunt at Baskett Slough Refuge.

Overview

The Willamette Valley Refuges include a diversity of native habitats and agricultural lands. Approximately 40 percent of the land is managed in cultivated croplands to provide forage for wintering Canada geese. The other 60 percent of the land base is occupied by wetlands, wet prairie, upland prairie/oak savanna, oak woodlands, mixed deciduous/coniferous forests, riparian, and riverine habitats.

The refuges support some of the largest and most ecologically significant blocks of native habitat in the Willamette Valley. The refuge's seasonal wetlands and farmed agricultural fields provide important resting and feeding areas for migrating waterfowl and shorebirds within the Pacific Flyway and they support the core populations of wintering geese in the Valley. In particular, the refuges hold the largest number of wintering dusky Canada geese within their range. At peak numbers, the refuges also hold more wintering ducks than any location in western Oregon south of the Columbia River (USFWS 2010b).

The prairies of Baskett Slough NWR support the largest population of the endangered Fender's blue butterfly within its range, as well as several species of listed and rare plant species. Oak woodlands are another important habitat found on the refuges, and are managed to support a diversity of wildlife species, especially migratory songbirds.

The combination of native and agricultural habitats on the Willamette Valley refuges results in a diversity of lands which support more than 300 species of birds, mammals, fish, reptiles, and amphibians, 9 of which are federally listed as threatened or endangered. Overall, the refuge lands are key to healthy populations of wildlife dependent on these rare habitats, as well as the opportunity to recover listed species.

Map 3 shows the distribution of habitat types currently existing at Baskett Slough Refuge (Alternative 1 – No Change) and habitat distribution proposed under the CCP (Alternative 2).

Croplands

The primary agricultural crops grown on the refuges are grass seed (annual ryegrass, perennial ryegrass, and fescue) grown as green forage for wintering Canada geese. The total area of agricultural lands on Baskett Slough Refuge are 1,141 acres (Map 3). (This does not include areas termed non-agricultural grassland, which are areas that may have been farmed in the past that have not yet been restored.)

Key Species Supported: Cultivated grass fields or seed crops such as corn are maintained to provide food for wintering Canada geese.

Wetlands

Baskett Slough NWR has 597 acres of wetlands (Cackler Marsh, Dusky Marsh, etc.) consisting of a series of managed impoundments extending from Morgan Reservoir down along Baskett Slough to the eastern boundary (Map 3). These wetlands were restored in the mid-late 1990s by capturing seasonal flows using dikes and water control structures (WCS) in Baskett Slough, which formerly had been channelized to allow farming throughout the entire basin. Stored water is available in the summer and fall from Morgan Reservoir, an impoundment on the upper end of Baskett Slough that was present prior to refuge acquisition. This water can be released into various wetlands to provide some water for early fall migratory birds, but is only adequate to partially flood one or two impoundments downstream of the reservoir.

Key Species Supported: Wetland habitats are used heavily by a diversity of wildlife including migratory waterfowl, shorebirds, wading birds, raptors, fish and amphibians. Wetlands are the primary focus of the public wildlife viewing areas on the Refuge Complex.

Canada Geese and Other Waterfowl

Geese

The three Willamette Valley refuges were initially established in the mid-1960s to provide winter foraging and roosting areas for dusky Canada geese. Only about 15,000 geese wintered in the Willamette Valley area at that time. Changes in migration patterns, especially with cackling geese, have resulted in a current estimate of total wintering geese of over 200,000 for this same area. Dusky Canada geese have declined significantly in recent years, largely attributed to changes to their breeding grounds on the Cooper River Delta in Alaska as a result of uplifting from the 1964 earthquake. Their population fluctuated between 10-20,000 birds, but has recently fallen below 10,000 birds (2009 estimate was 6,709). They make up less than 10 percent of the winter flock in the Valley and are below Pacific Flyway objectives. Duskies generally arrive in the Willamette Valley in late October-early November, and remain until they migrate back north in early April. Of the three refuges, Finley supports the largest concentration of dusky Canada geese.

The cackling goose (cackler) is now the most abundant goose on all three refuges. In addition to the cacklers and duskies, other species of Canada geese that regularly winter on the refuges in large numbers include Taverner's, lesser, and western (great basin). Other geese found mixed in with flocks of Canada geese include white-fronted, snow, Ross' geese, and an occasional black brant. White-fronted geese are more common on the spring migration in late April and early May. Most migratory geese leave the Willamette Valley for nesting grounds by early May. Non-migratory western Canada geese are present year-round and nest at each of the three refuges. All of the geese forage on agricultural crops grown through the farming program and roost on refuge wetlands. The mid-winter waterfowl survey, conducted since the 1950s, is a nationwide coordinated survey conducted in early January of each year. In the Pacific Flyway, waterfowl surveyors cover all important waterfowl habitat throughout each state targeting the first week in January. Although the numbers derived from mid-winter surveys are considered underestimates of abundance (not all areas are surveyed and large flocks of waterfowl are generally underestimated), they offer reasonable indices of change in waterfowl abundance.

Table 3-1 shows the mid-winter survey counts for geese on each of the three refuges for the last 10 years as well as the ten year average. Figure 3-1 shows the mid-winter survey counts for the last 10 years for the Willamette Valley section that stretches from Eugene to McMinnville.

It should be noted that the mid-winter survey serves as an index for comparative purposes and is not necessarily representative of the number of ducks and geese that may be present within the entire geographic area. Refuge counts for geese have generally ranged between 60,000 – 100,000 over the past several winters.

Depredation Concerns: Due to increasing numbers of Canada geese in the Valley and crop depredation complaints from grass seed farmers, a Depredation Plan was prepared in 1998. Changes to the plan are being considered at present because of Alaskan tribal interests in cackler populations and the acceptance by all parties that goose migration patterns have permanently changed. Restrictions on Canada goose harvest, especially duskies, have resulted in special goose hunting regulations for the Willamette Valley.

Ducks

Ducks are plentiful in late fall through the winter months, utilizing refuge wetlands and flooded grass fields. The average number of ducks wintering in the Willamette Valley over the last 10 years has been about 125,000 (USFWS 2010b). Numbers vary greatly depending on habitat conditions and yearly variables such as weather and breeding production. Using the mid-winter waterfowl survey numbers as an index, the number of wintering ducks in the Willamette Valley has more than doubled when compared to the early 1990s (see Figure 4-1). Although this increase is partially attributed to increased flyway populations, it also reflects the significant wetland habitat developments on the Valley refuges in the late 1990s and additional habitat restoration efforts on both refuge and private lands over the past decade. The most abundant duck species found on the mid-winter survey are the green-wing teal, northern pintail, mallard, and American wigeon. Of the 20 duck species that can be found wintering in the Willamette Valley, 13 of those have been documented as breeders on refuge lands.

Table 3-1 shows the mid-winter survey counts for ducks on each of the three refuges for the last 11 years as well as the past ten year average. Figure 3-1 shows the mid-winter survey counts for the last 10 years for the Willamette Valley section that stretches from Eugene to McMinnville.

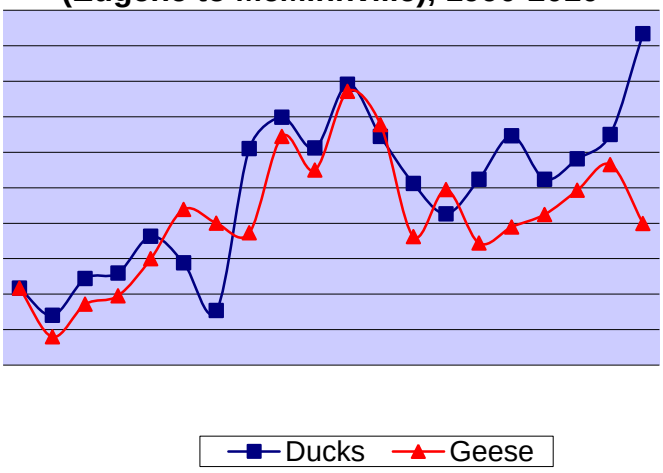
Swans

Wintering tundra swans roost on the large refuge wetlands, with peak numbers at Finley NWR in December averaging around 1,000 birds. Smaller numbers of swans can be observed at Ankeny and Baskett Slough NWRs from October through the spring. They traditionally move off refuge during the day to feed on nearby agricultural lands when winter rainfall floods the fields. Occasionally, trumpeter swans may be observed mixed with tundra swans.

Table 3-1. Willamette Valley Refuge Complex: Mid-winter Waterfowl Counts (1999-2010)

	Ducks					Geese			
	Ankeny	**Baskett**	**Finley**	**Total**		**Ankeny**	**Baskett**	**Finley**	**Total**
1999	13,288	15,895	36,840	66,023	**1999**	11,096	4,941	17,785	33,822
2000	28,620	25,319	42,889	96,828	**2000**	13,880	6,550	10,088	30,518
2001	19,510	26,000	35,330	80,840	**2001**	10,020	9,905	20,620	40,545
2002	37,240	20,486	16,649	74,375	**2002**	15,243	4,331	5,377	24,951
2003	17,567	22,350	16,281	56,198	**2003**	12,075	11,970	11,879	35,924
2005	10,454	18,253	37,349	66,056	**2005**	13,645	2,889	17,414	33,948
2006	14,979	17,310	22,324	54,613	**2006**	9,930	3,278	1,335	14,543
2007	5,595	8,435	17,644	31,674	**2007**	4,223	9,303	2,780	16,306
2008	5,394	13,392	25,879	44,665	**2008**	4,080	7,440	16,999	28,519
2009	9,841	16,790	33,128	59,759	**2009**	2,783	14,960	17,835	35,578
2010	26,267	16,561	75,173	118,001	**2010**	13,227	2,105	9,774	25,106
10 Year AVERAGE	**16,249**	**18,423**	**28,431**	**63,103**		**9,698**	**7,557**	**12,211**	**29,465**

Figure 3.1 Mid-Winter Waterfowl Aerial Survey Results for the Willamette Valley (Eugene to McMinnville), 1990-2010



Source: Willamette Valley NWRC files
Notes: No Willamette Valley Mid-winter Survey was conducted in 2004. Significant wetland restoration on the WVNWRC began in 1995.

Waterbirds and Shorebirds

Waterbirds

Commonly observed waterbirds on the Willamette Valley refuges include great blue and green herons, great egrets, American bittern, American coot, Virginia rail, sora, pied-billed, horned, eared, and western grebes. Double-crested cormorants are observed in small numbers at each of the three refuges. Eleven species of gulls and terns are all generally rare visitors to the refuges. Black terns have nested on Baskett Slough in the past, but have not been observed in recent years. Heron rookeries are present adjacent to Muddy Creek at Finley and on the west side of Snag Boat Bend. However, Snag Boat Bend's heronry has not been active since 2007, possibly due to the close proximity of increasing bald eagle nests on the Willamette River. The heronry adjacent to Muddy Creek may also be influenced by the close proximity to an eagle nest. There is also a small heronry located on the northern butte at Baskett Slough.

Shorebirds

Of the 16 species of shorebirds either found as migrants or wintering on refuge, dunlin are the most numerous (past averages have been 10-20,000 in winter months). In 1996, wintering dunlin at Ankeny exceeded 22,000 (K. Viste-Sparkman pers. comm.). In part due to natural succession of wetland vegetation over subsequent years and a decrease in open mudflats, wintering dunlin numbers at Ankeny have declined, dropping to less than 8,000 in 2007 (M. Monroe pers. comm.). Periodic marsh rehabilitation efforts, usually spring drawdowns combined with summer discing to set back undesirable wetland vegetation, are expected to return some of the wetland margins to early successional mudflats and could result in a rebound of wintering numbers of dunlin. However, wintering dunlin are transitory and have been documented using wetlands across the Valley that have been restored under the NRCS Wetland Reserve Program and the Partners for Fish and Wildlife Program.

Shorebird species including yellowlegs, sandpipers, and dowitchers pass through the refuges in small numbers en route to wintering or nesting grounds, with concentrations in May and late summer. Nesting shorebirds include killdeer, black-necked stilt (Baskett Slough), spotted sandpiper, and Wilson's phalarope (Ankeny and Baskett Slough). Killdeer are a year-round resident to the three refuges, nesting on road sides and gravel pullouts and wintering in high numbers on grazed farm fields (Sanzenbacher and Haig 2002). Killdeer nests are subject to both predation and accidental destruction by vehicles because of their preference for open nest sites on gravel. Wilson's snipe were documented nesting at Ankeny NWR in 2007 and may nest at other refuges in suitable habitat.

Water management to expose mudflats during the late winter and early spring brings the risk of allowing reed canary grass to germinate and become established. Any drawdowns of managed impoundments need to be of short duration to minimize the risk, and also include the ability to re-flood the exposed area to drown any potential seedlings that germinated. Exposed areas that are disked annually in the summer could provide additional shorebird habitat. Although the Valley refuges are not significant breeding sites for shorebirds, these species provide a wildlife viewing opportunity not commonly found in the Willamette Valley. Rare breeders found at Baskett Slough include Wilson's phalarope and black-necked stilts, both species normally found east of the Cascades. Wilson's snipe have been documented breeding on Ankeny and likely are rare breeders on the other two refuges. The Refuge Complex has taken measures to protect these breeding populations from disturbance by restricting public access to wetlands on Baskett Slough Refuge during the spring and summer.

Threatened, Endangered, and Rare Species

Federally Listed or Proposed Plants

Golden paintbrush: Golden paintbrush is a federally threatened species that had been extirpated from Oregon. The historic range included the upland prairies of the Willamette Valley. As part of a common garden experiment developed to determine appropriate seed sources and recovery sites, golden paintbrush was out-planted on several sites at Baskett Slough and W.L. Finley Refuges. Although the study has been completed, experimental populations were retained on both refuges. Management has included fall mowing and in some years, prescribed fire. It appears that plants are surviving well at both refuges, and future plans include expansion of those populations with out-planting in order to work towards sustainable populations specified in the Recovery Plan (USFWS 2010a).

Willamette daisy: The Willamette daisy was listed as endangered in 2000. It is a perennial forb found on both wet and upland prairies. The loss of native Willamette Valley prairie is the primary reason for the decline, and it appears to be a poor competitor with non-native grasses. A significant population of Willamette daisy is found on the native upland prairies of Baskett Slough Refuge. Recent efforts have included out-planting of Willamette daisy in a common garden study to compare success in various sites. Management efforts to protect and maintain Willamette daisy populations include herbicide treatments of tall oatgrass where it threatens the plants, mechanical treatments to reduce woody vegetation, and conducting prescribed burns.

Kincaid's lupine: Kincaid's lupine, a threatened species, was also listed in 2000. It is found in native upland prairie of the Willamette Valley and is the key host species for the endangered Fender's blue butterfly. Baskett Slough Refuge has a small population of Kincaid's lupine, but many appear to have hybridized with spurred lupine, a closely related species. Similar to other prairie forbs, degradation of native prairie habitat from the encroachment of woody vegetation and invasive species is a significant threat to Kincaid's lupine.

Nelson's checker-mallow: Nelson's checker-mallow was federally listed as threatened in 1993. Within the Willamette Valley, Nelson's checker-mallow most frequently occurs in Oregon ash swales and meadows with wet depressions or along streams. It also populates wetlands within remnant prairie grasslands and roadsides. Due to an intolerance of encroachment of woody vegetation, Nelson's checker-mallow has declined. Efforts to conserve and restore this threatened species have been undertaken at Finley, Ankeny, and Baskett Slough NWRs, including annual mowing, prescribed fire, extensive out-planting of nursery plants, protection of roadside populations, and plant relocation as needed to prevent mortality from flooding or agricultural activities.

Federally Listed or Proposed Fish and Wildlife

Fender's blue butterfly: The Fender's blue butterfly is a Willamette Valley endemic species thought to be extinct until it was rediscovered in 1989 in native prairie remnants. In 2000, the butterfly, along with its required larval food plant, Kincaid's lupine, were listed as endangered under the U.S. Endangered Species Act. The population on Baskett Butte, part of Baskett Slough NWR in Polk County, remains as the single largest population within its range, estimated at 1445 in 2007 (Hammond 2007). The butterflies at Baskett Butte depend almost completely on spurred lupine, an

alternate host plant. Baskett Butte provides one of the largest of these "islands" in the Willamette Valley, helping to sustain the population of Fender's blue butterfly.

Streaked horned lark: The streaked horned lark, a subspecies of the horned lark, has undergone extensive range retraction and probable population decline in the previous half-century. The streaked horned lark was proposed as threatened under the U.S. Endangered Species Act in October 2012. An analysis of recent data estimates the current rangewide population of streaked horned larks to be about 1,170–1,610 individuals (Altman 2011). There are about 900–1,300 breeding streaked horned larks in the Willamette Valley (Altman 2011). The largest known populations of streaked horned larks breed in the southern Willamette Valley at the Corvallis Municipal Airport and on the Fish and Wildlife Service's Willamette Valley National Wildlife Refuge Complex.

The streaked horned lark prefers flat, sparsely vegetated ground on which to forage and nest. If the vegetation is above a few inches high, the lark will avoid the habitat because of a decrease in foraging and predator detection abilities. The Willamette Valley NWRC provides large tracts of suitable habitat for the streaked horned lark. Flat fields planted with grass seed crops but then intensely grazed by wintering geese, are preferred foraging grounds for the lark. During the breeding season, the three Willamette Valley Refuges provide 3 of only 5 known geographically consistent breeding sites for the streaked horned larks (Moore 2008).

The Willamette Valley NWRC, specifically Finley and Baskett Slough Refugess, have the potential to increase the abundance of streaked horned larks with selective management. If Baskett Slough and Finley NWRs are considered crucial breeding sites and management activities are implemented to support these birds, this may help facilitate the removal of the lark from the Candidate list (Moore 2008). The refuge is currently working with Oregon State University and streaked horned lark researchers to monitor and assess breeding success in agricultural fields. In addition, efforts are being made to provide suitable horned lark habitat in agricultural fields where extensive grazing by geese has eliminated crop yields for cooperative farmers. These include Field 8/12 on W.L. Finley NWR and Dusky Prairie at Baskett Slough NWR.

Other Wildlife and Plants

Fish species: A number of wetland impoundments and stream channels support a small number of fish species, mostly introduced. Mosquito fish, carp, and brown bullheads are the most widespread. Carp are found within the impoundments along Baskett Slough Refuge. Periodic de-watering of seasonal wetlands helps to control carp populations and other warm-water exotic fish. Crappie and bluegill are also located within several wetlands on Baskett Slough Refuge.

Land birds: Landbirds can be found in all habitats of the refuges, including riparian woodlands, agricultural farm fields, oak savanna, and seasonal and permanent wetlands. Over 128 species of resident and migrant landbirds have been observed on the Willamette Valley refuges, including 22 species of raptors (owls, hawks, falcons, and eagles), 15 nonpasserines (woodpeckers, hummingbirds, kingfishers, doves, and pigeons), and 91 species of passerines (e.g., sparrows, finches, warblers, flycatchers, and swallows). Long-distance migrants travel between breeding grounds in temperate North America and wintering grounds in Central and South America. Resident species both breed and winter in the local area, migrating short distances.

Land mammals: Forty-three species of land mammals have been documented on the refuges ranging

from large mammals such as elk, black-tail deer, black bear, and coyotes, to small shrews and several species of bats. Native western gray squirrels can be found in oak woodlands on Baskett Slough and W.L. Finley Refuges. An occasional mountain lion has been reported at both Finley and Baskett Slough Refuges. River otter, mink, and beaver inhabit the wetlands and stream channels at all three refuges. Coyotes are also found at all three refuges. Bats such as the little brown bat and Townsend's big-eared bats inhabit snags throughout the refuges.

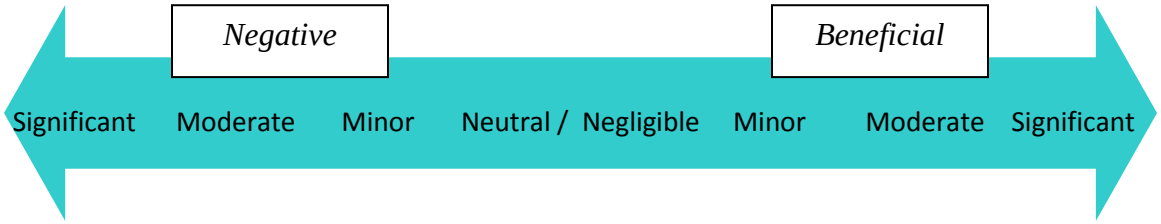
Reptiles and Amphibians: Twenty-one species of reptiles and amphibians occur in the Willamette Valley, most of which have been observed on the Valley refuges. Northern red-legged frogs and Pacific chorus frogs inhabit riparian areas and utilize many of the seasonal and permanent wetlands as breeding habitat. Rough skinned newts, northwestern salamanders, and the introduced bullfrog are other common amphibians found on the refuges. Much of the native wetland habitat in the Valley has been degraded due to exotic plants like reed canary grass (McAllister and Leonard 1997), and drained or ditched for agriculture. Many reptiles found in the Willamette Valley occur more frequently in open habitats, suggesting that succession to closed canopy conditions (e.g., the loss of oak savanna) may be restricting their range and numbers (Pacific Wildlife Research Inc. 1999). Oak restoration efforts at Baskett Slough and Finley NWRs, which result in more open savanna or woodland conditions, may therefore benefit some reptile species. Other common reptiles present in the grassland habitats on the refuges include gopher snakes, garter snakes, and racers.

Invertebrates: Both terrestrial and aquatic invertebrates are an important food source for many species found on the refuges. A number of studies have been conducted over the past decade, but there is no comprehensive list of invertebrates found on the Refuge Complex. Dragonflies and damselflies were inventoried across the complex in 2005 to help with preparation of an identification guidebook (S. Gordon pers. comm.). Fender's blue butterflies are surveyed annually on Baskett Butte at Baskett Slough Refuge.

Chapter 4. Environmental Consequences

The effects analysis has been developed by a) identifying the species groups, habitats, refuge users, aspects of the physical environment, and other resources of interest; and b) identifying effects to these resources that could potentially result from implementing the deer hunt program as described in Chapter 2 above. Effects are described in terms of the change from current conditions, that is, the deer hunt program as currently administer at the Refuge. The no-action alternative (current management) is considered to have a neutral effect because minimal or no changes to deer hunting program would occur under this "no change" alternative.

The information used in this EA was primarily obtained from the CCP/EA. The information used in developing the CCP/EA was obtained from relevant scientific literature, existing databases and inventories, consultations with other professionals, and professional knowledge of resources based on field visits, and experience.



The terms identified below were used to describe the scope, scale, and intensity of effects on natural, cultural, social, and economic (including recreational) resources. Effects may be identified further as beneficial or negative.

- **Neutral or Negligible.** Resources would not be affected, or the effects would be at or near the lowest level of detection. Resource conditions would not change or would be so slight there would not be any measurable or perceptible consequence to a population, wildlife or plant community, recreation opportunity, visitor experience, or cultural resource. If an impact is not discussed, it is assumed to be neutral.

- **Minor.** Effects would be detectable but localized, small, and of little consequence to a population, wildlife or plant community, other natural resources; social and economic values, including recreational opportunity, and visitor experience; or cultural resources. Mitigation, if needed to offset adverse effects, would be easily implemented and successful, based on knowledge and experience.

- **Moderate.** Effects would be readily detectable and localized with measurable consequences to a population, wildlife, or plant community or other natural resources; social and economic values, including recreational opportunity, and visitor experience; or cultural resources. Mitigation measures would likely be needed to offset adverse effects, and could be extensive, moderately complicated to implement, and probably successful based on knowledge and experience.

- **Significant (major).** Effects would be obvious and would result in substantial consequences to a population, wildlife or plant community or other natural resources; social and economic

values including recreation opportunity and visitor experience; or cultural resources within the local area or region. Extensive mitigating measures may be needed to offset adverse effects and would be large-scale in nature, possibly complicated to implement, and may not have a high degree of probability for success. In some instances, major effects would include the irretrievable loss of the resource.

Time and duration of effects have been defined as follows:

- **Short-term or Temporary.** An effect that generally would last less than a year or season.
- **Long-term.** A change in a resource or its condition that would last longer than a single year or season.

Anticipated Effects of Waterfowl hunting at Baskett Slough Refuge

Wildlife and Habitat Effects

Disturbance to wintering geese would be minimized due to the following provisions. Waterfowl hunting would not be permitted on any refuge lands after October 1, which marks the beginning of the wintering season for migratory waterfowl in the Willamette Valley. Harm to other biological resources would be avoided, since hunters would only be allowed in designated areas and will be limited to a short time period in early-mid fall.

Impacts to Target Wildlife

Sport hunting involves the direct take of Refuge wildlife designated as huntable game species by Refuge regulations. In addition to loss of individual target species, some additional waterfowl are sometimes crippled or killed and not retrieved.

The following analysis of hunting effects utilizes data on population and harvest, comparing the number of birds taken at various scales with the estimated population size. For ducks taken during the wintering season, the mid-winter waterfowl survey count is used as the primary index. For resident geese, the population estimates are used as the primary index.

Wintering Population Index: Recent mid-winter waterfowl survey counts for geese and ducks in the Pacific Flyway, the State of Oregon, and each of the refuges are presented in Table C-4. These numbers only represent an index, not an absolute population number (see section 4.10). Oregon hosts only a small percentage of wintering waterfowl; within the Pacific Flyway, the majority of waterfowl winter in California.

Harvest Management – Regulatory Procedures: The hunting of waterfowl in the United States is based upon a thorough regulatory setting process that involves numerous sources of waterfowl population and harvest monitoring data. Waterfowl populations throughout the United States are managed through an administrative process known as flyways, of which there are four (Pacific, Central, Mississippi, and Atlantic). Oregon is included in the Pacific Flyway. The review of the policies, processes, and procedures for waterfowl hunting are covered in a number of documents.

NEPA considerations by the Service for hunted migratory game bird species are addressed by the programmatic document, ‘‘Final Supplemental Environmental Impact Statement: Issuance of Annual Regulations Permitting the Sport Hunting of Migratory Birds’’ filed with the Environmental Protection Agency on June 9, 1988. The Service published the Record of Decision for this document on August 18, 1988 (53 FR 31341). This document is in the process of being updated; in August

2009, a Draft Supplemental Environmental Impact Statement: Issuance of Annual Regulations Permitting the Hunting of Migratory Birds (hereafter abbreviated as SEIS 2009) was released (US DOI 2009). Annual NEPA considerations for waterfowl hunting frameworks are covered under a separate Environmental Assessment and Finding of No Significant Impact.

Because the Migratory Bird Treaty Act stipulates that all hunting seasons for migratory game birds are closed unless specifically opened by the Secretary of the Interior, the Service annually promulgates regulations (50 CFR Part 20) establishing the Migratory Bird Hunting Frameworks. The frameworks are essentially permissive in that hunting of migratory birds would not be permitted without them. Thus, in effect, Federal annual regulations both allow and limit the hunting of migratory birds.

The Migratory Bird Hunting Frameworks provide season dates, bag limits, and other options for the States to select that should result in the level of harvest determined to be appropriate based upon Service-prepared annual biological assessments detailing the status of migratory game bird populations. In North America, the process for establishing waterfowl hunting regulations is conducted annually. In the United States, the process involves a number of scheduled meetings (Flyway Study Committees, Flyway Councils, Service Regulations Committee, etc.) in which information regarding the status of waterfowl populations and their habitats is presented to individuals within the agencies responsible for setting hunting regulations. In addition, public hearings are held and the proposed regulations are published in the Federal Register to allow public comment.

For waterfowl, annual assessments used in establishing the Frameworks include the Breeding Population and Habitat Survey, which is conducted throughout portions of the United States and Canada. This survey is used to establish a Waterfowl Population Status Report annually. In addition, the number of waterfowl hunters and resulting harvest are closely monitored through both the Harvest Information Program (HIP) and Parts Survey (Wing Bee). Since 1995, such information has been used to support the adaptive harvest management (AHM) process for setting duck-hunting regulations. Under AHM, a number of decision-making protocols render the choice (package) of pre-determined regulations (appropriate levels of harvest) which comprise the framework offered to the States that year. Each State's wildlife commission then selects season dates, bag limits, shooting hours and other options from the Pacific Flyway package. Their selections can be more restrictive, but cannot be more liberal than AHM allows. Thus, the level of hunting opportunity afforded each State increases or decreases each year in accordance with the annual status of waterfowl populations.

Season dates and bag limits for national wildlife refuges open to hunting are never longer or larger than the State regulations. In fact, based upon the findings of an environmental assessment developed when a refuge opens a new hunting activity, season dates and bag limits may be more restrictive than the State allows. Each national wildlife refuge considers the cumulative impacts to hunted migratory species through the Migratory Bird Frameworks published annually in the Service's regulations on Migratory Bird Hunting.

Estimated harvest mortality: Waterfowl hunting at Baskett Slough Refuge would result in some direct mortality to resident geese and to wintering ducks. The expected take of geese and ducks at the Refuge due to hunting is captured in Table 4-1, along with area harvests at flyway, state, and refuge scales for the years 2007 and 2008 as a point of reference.

Although in Table 4-1, harvest appears to represent more than the actual mid-winter count for ducks at the State level (not at the Refuge level), it is important to remember that to make any kind of comparison between the seasonal harvest and some population level, an estimate of the number of birds available for harvest in Oregon (those that were in the state for at least one day during the entire 107 day season - likely millions) would be needed. The mid-winter count represents simply a snapshot at one point during mid-winter, thus can underestimate total wintering populations. The number of birds migrating through and breeding in Oregon likely far exceeds the number of birds that actually winter in the State (pers. comm. Brandon Reishus, ODFW, 12/28/09).

Also, the Service's harvest estimate for Oregon has increased substantially since 2006 for reasons which ODFW cannot explain, but survey error cannot be ruled out (pers. comm. Brandon Reishus, ODFW, 12/28/09).

The duck harvest in Oregon accounted for approximately 20 percent of the Pacific Flyway duck harvest in 2007 and 2008. The estimated duck harvest for the Pacific Flyway in 2008 was 3.3 million birds, or approximately 24 percent of the estimated U.S. harvest of 14 million ducks in that year (US DOI 2009). Similarly, the goose harvest in Oregon accounted for approximately 20 percent of the Pacific Flyway goose harvest in 2007 and 2008. The estimated goose harvest for the Pacific Flyway was 550,000, or approximately 15 percent of the estimated U.S. goose harvest in 2008 (US DOI 2009).

Direct mortality stemming from Refuge hunts: The estimated refuge duck harvest from the youth hunt is less than 100 ducks over the seasons to be established. This estimated harvest represents a tiny fraction of a percent of the total midwinter population of wintering ducks in the State of Oregon and an even smaller fraction of the Pacific Flyway population.

Similarly, the number of resident Canada geese projected to be taken is less than 500 geese, which compared with area population is negligible. The September goose hunt would confine harvest to the Pacific Population of Western Canada geese, which are currently above population objectives in the Flyway (Subcommittee on Pacific Population Western Canada Goose 2000). The hunt would contribute to current state and federal efforts to lower this population.

At this time, duskys would not be impacted as they arrive later in the fall. If dusky arrival time shifted to earlier in the fall, these hunts would be re-evaluated.

Given the small amount and season of the expected take, the hunt as designed will not adversely affect the refuge's ability to sustain optimum population levels for meeting other refuge objectives, specifically maintaining wintering populations of migratory waterfowl, and maintaining enough wildlife to provide for wildlife viewing enjoyment.

Table 4-1. Harvest and Populations at Flyway, State, and Local Scales: Ducks and Geese

Area	Area harvest 2007	Area harvest 2008	Breeding Population Estimate	Mid-Winter Population Index	Estimated Refuge Harvest	
DUCK					**Alts. 1 and 3**	**Alt. 2**
Pacific Flyway, duck	3,400,000[3]	3,300,000[3]		5.4 million (2008)		
State of Oregon, duck	680,000[3]	640,000[3]		~470,000 (2008)		
Ankeny Refuge, duck	0	0		5,300 (2008)[5] 5,600 (2007)[5]	0	0
Baskett Slough Refuge, duck	0	0		13,000 (2008)[5] 8,000 (2007)[5]	0	<100
W.L. Finley Refuge, duck	0	0		26,000 (2008)[5] 16,000 (2007)[5]	0	0
GOOSE					**Alts. 1 and 3**	**Alt. 2**
Pacific Flyway, goose	470,000[3]	550,000[3]		1.8 million (2008)[4]		
State of Oregon, goose (total season)	96,000[3]	105,000[3]		182,000 (2008)[4]		
State of Oregon, September goose	8,000	10,400	51,000[6] (state)	-		
Ankeny Refuge, goose	0	0		4,000 (2008)[5] 4,200 (2007)[5]	0	0
Baskett Slough Refuge, goose	0	0		7,400 (2008)[5] 9,300 (2007)[5]	0	<500
W.L. Finley Refuge, goose	0	0		17,000 (2008)[5] 2,800 (2007)[5]	0	0

Sources: 1. US DOI 2009 – numbers rounded to two significant digits; 2. http://web.ftc-i.net/~tuffye/mwi_2008_flypac.jpg; 3. Raftovich et al. 2009; 4.Trost and Sanders 2008; 5. Jock Beall, Complex biologist, 6. Brandon Reishus, Oregon Department of Fish and Wildlife

Disturbance Effects: In addition to direct take, hunting causes disturbances to feeding and resting waterfowl as well as nontarget species because of the noise (shotgun), movement, vehicular activity, and use of dogs for this activity. Studies cited by Korschgen and Dahlgren (1992) indicate that water-related activities by humans, including boating, hunting, and shoreline activities, do cause

disturbance to waterfowl, manifested by alertness, fright (obvious or unapparent), flight, swimming, disablement, or death. Human disturbance can compel waterfowl to change food habits, feed only at night, lose weight, or desert feeding areas (Korschgen and Dahlgren 1992). Although disturbance from hunting is noted to have effects directly on waterfowl, US DOI (2009) concluded that hunting disturbance is of less impact than the direct mortality caused by hunting. Further, since the direct impacts of hunting cannot be clearly demonstrated to be detrimental at most population levels, then disturbance will not have any pronounced population level effects on waterfowl (US DOI 2009).

As described above, the hunt program would occur in up to 856 acres each year, or up to 34 percent of the Refuge wetland acres (see Map 2), and would only occur on 6 days each year; it is designed to pose minimal disturbance over the course of the year. However, due to disturbance that will occur on the days of hunt, hunting could result in some redistribution of Western Canada geese at Baskett Slough refuge. Disturbance effects associated with hunting were examined in the SEIS 2009 for waterfowl and some other migratory bird species. On the basis of a review by Dahlgren and Korschgen (1992), the SEIS 2009 noted that disturbance has its most pronounced detrimental effect during the nesting period. Hence the SEIS 2009 noted that hunting related disturbance does not have any pronounced population level effects (US D0I 2009).

Impact to Refuge Habitats

Potential effects to refuge habitats would be confined to wetland and cropland habitat types (see Maps 2 and 3). Approximately 20-34% of Baskett Slough Refuge would be open to hunting during the specified seasons (6 days/year). No facilities will be constructed expressly for the waterfowl hunting program, therefore there would be no direct loss of habitat. Impacts to soils and vegetation from trampling would be negligible due to the very limited number of people walking in the hunt zones (low number of users and days of use expected) and plants have senesced by the beginning of hunting season and are not as vulnerable to damage. There is some potential for conflicts with the cooperative farming program at Baskett Slough but these are minimized by limiting waterfowl hunting to the 6 days mentioned above.

Impacts to Non-target Wildlife

Non-hunted wildlife would include any non-target waterfowl and any other birds; small and medium-sized mammals; reptiles, amphibians, and invertebrates. Occasionally, nontarget species are illegally killed by hunters by accident or intentionally. However, the potential effect to non-hunted wildlife is largely in the realm of disturbance (see discussion above).

Disturbance from Dogs: Dogs elicit a greater response from wildlife than people on foot alone (MacArthur et al. 1982, Hoopes 1993). The presence of dogs may disrupt foraging activity in shorebirds (Hoopes 1993) and disturb roosting activity in ducks (Keller 1991). Despite thousands of years of domestication, dogs still maintain instincts to hunt and chase. Given the appropriate stimulus, those instincts can be triggered. Dogs that are unleashed or not under the control of their owners may disturb or potentially threaten the lives of some wildlife. In effect, off-leash dogs increase the radius of human recreational influence or disturbance beyond what it would be in the absence of a dog.

The role of dogs in wildlife diseases is poorly understood. However, dogs host endo- and ectoparasites and can contract diseases from, or transmit diseases to, wild animals. In addition, dog waste is known to transmit diseases that may threaten the health of some wildlife and other domesticated animals. Domestic dogs can potentially introduce various diseases and transport

parasites into wildlife habitats (Sime 1999).

The cumulative effects of disturbance to non-hunted birds and other species under the proposed action are expected to be minor for the following reasons. Hunter education courses will be required for youths. Orientation will be provided to all hunters at the start of each hunting day. These measures will help to reduce effects to non-target species. In addition, hunting seasons do not coincide with the nesting season, thus reproduction will not be reduced by hunting. Disturbance to the foraging or resting activities of migrating or resident birds might occur, but would be minor because of the small amount of area available for these hunts, relative to the sizes of the Refuge, and the limited time parameters for hunting. There would not be disturbance to wintering wildlife because the hunts would be conducted prior to the wintering period.

Disturbance to other taxa would be unlikely or negligible for the following reasons. Encounters with reptiles and amphibians in the early fall would be few and should not have cumulative negative effects on reptile and amphibian populations. Refuge regulations further mitigate possible disturbance by hunters to non-hunted wildlife. Vehicles would be restricted to roads and the harassment or taking of any wildlife other than the game species legal for the season would not be permitted.

Some species of bats, butterflies, and moths are migratory. Cumulative effects to these species would be negligible. Although hunting would be allowed during September when these species are migrating, hunter interaction would be commensurate with that of non-consumptive users.

Impacts to Listed Species

This use is unlikely to pose more than a negligible impact to threatened and endangered species. Some trampling of listed plants could happen, but most of the listed plants have senesced by the beginning of hunting season and are not as vulnerable to damage. Waterfowl hunters would not be accessing Fender's blue butterfly habitat under the hunt program described above.

Social and Economic Effects

Impacts to Other Priority Public Uses

Hunting has the potential to disturb Refuge visitors engaged in other priority public uses. To minimize this potential conflict, the waterfowl hunt season would be limited in time to a total of six days - two weekends during the September goose season and the one weekend for the youth hunt. During this time, hunting locations would be limited to designated wetlands and crop fields. The month of September is not a particularly popular month for attracting non-hunters to view wildlife; therefore, the direct impacts to other users are expected to be minor. In addition, there is a potential for a minor indirect user conflict to develop. Because the wetlands and fields are highly visible, and are otherwise off-limits all year to other members of the public, allowing hunters into these wetlands may cause a perception of favoritism for one user group over another. This could be alleviated in the future, if necessary, by conducting the hunt in wetlands less viewable to the general public.

Providing waterfowl hunting opportunity at Baskett Slough Refuge helps to better provide a "Big Six" use, and this use is currently not provided at any of the Willamette Valley Refuges. Providing opportunities for youth is an important initiative in the Service and helps address a public desire to see more hunting opportunities for youth.

No significant effects to roads, trails, or other infrastructure from the hunting program are foreseen. Normal road, trail, and facility maintenance will continue to be necessary. The proposed waterfowl hunt at Baskett Slough Refuge would require staff time by the Refuge Manager, maintenance staff, and the law enforcement officer. Approximately $56,000 in one-time costs are projected, and the total annual cost to administer the hunt with the changes proposed is projected to be approximately $13,000 per year.

Other Effects

Other indirect beneficial impacts of Refuge hunting exist. Hunting can contribute to wildlife and habitat conservation and provide educational and sociological benefits. The hunting community in general remains the largest support base for funding land acquisitions in the Refuge System through the purchase of Duck Stamps. Refuges provide an opportunity for a high quality waterfowl hunting experience to all citizens regardless of economic standing. Many Refuges have developed extensive public information and education programs bringing hunters into contact with Refuge activities and facilitating awareness of wildlife issues beyond hunting.

Economic Effects

Refuge Visitor Expenditures in Local Economy: Spending associated with recreational visits to national wildlife refuges generates significant economic activity. The report *Banking on Nature: The Economic Benefits of National Wildlife Refuges Visitation to Local Communities* (Carver and Caudill 2007) reported that more than 34.8 million visits were made to national wildlife refuges in FY 2006 which generated $1.7 billion of sales in regional economies. Accounting for both the direct and secondary effects, spending by refuge visitors generated nearly 27,000 jobs, and over $542.8 million in employment income. Approximately 82 percent of total expenditures were from non-consumptive activities, twelve percent from fishing, and six percent from hunting (Carver and Caudill 2007).
A visitor usually buys a wide range of goods and services while visiting an area. Major expenditure categories include lodging, restaurants, supplies, groceries, and recreational equipment rental. In this analysis we use average daily visitor spending profiles from the Banking on Nature report (Carver and Caudill 2007) that were derived from the 2006 National Survey of Fishing, Hunting, and Wildlife Associated Recreation (NSHFWR - USFWS 2008). The NSHFWR reports trip related spending of state residents and non-residents for several different wildlife-associated recreational activities. For each recreation activity, spending is reported in the categories of lodging, food and drink, transportation, and other expenses. Carver and Caudill (2007) calculated the average per-person per-day expenditures by recreation activity for each Service region. We used the spending profiles for non-residents for Service Region 1 (the region the Refuge Complex is located in), and updated the 2006 spending profiles to 2010 dollars using the Consumer Price Index Inflation Calculator (U.S. Bureau of Labor Statistics, 2011). Average daily spending profiles for nonresident visitors to Region 1 for big game hunting ($92.07 per-day), migratory bird hunting ($186.83 per-day), and fresh water fishing ($63.96 per-day) were used to estimate non-local visitor spending for refuge hunting and fishing related activities. The average daily nonresident spending profile for non-consumptive wildlife recreation (observing or photographing fish and wildlife) was used for non-consumptive wildlife viewing activities ($117.87 per-day).

Table 4.1 Estimated Annual Refuge Visitation by Activity at Baskett Slough Refuge

Visitor activity	Total number of visits	Percentage of non-local visits (%)	Total number of non-local visits	Number of hours spent at Refuge	Number of non-local visitor days*
No Action					
Nature trails/ other wildlife observation	218,528	20%	43,706	4	21,853
CCP					
Waterfowl and migratory bird hunting	140	10%	14	6	11
Nature trails/ other wildlife observation	249,773	20%	49,955	4	24,977

* One visitor day = 8 hours.

Visitor spending profiles are estimated on an average per day (8 hours) basis. Refuge personnel estimate that non-local big game hunters spend a full visitor day (8 hours) while waterfowl hunters and anglers spend approximately 6 hours (2/3 a visitor day). Non-local visitors that view wildlife on nature trails or participate in other wildlife observation activities typically spend 4 hours (1/2 half a visitor day). Table 4.1 shows the number of non-local visitor days by recreation activity at Baskett Slough Refuge.

Waterfowl hunting visitation is anticipated to result in 140 visits to the refuge with each visit representing $186.83 in expenditures (Carver and Caudill 2007). Total expenditures associated with 140 visits associated with waterfowl hunting would total approximately $26,189. These revenues represent a negligible effect in the context of the Polk County economy dominated by agriculture production ($89 million in 2002).

Environmental Effects Summary

Potential effects of waterfowl hunting to target populations, non-target species, listed species, refuge habitats, and other public use programs are summarized below in Table 4.2.

Table 4.2 Anticipated Effects of the Waterfowl Hunt

Effects	Conclusion
Effects to target populations	The September goose hunt would confine harvest to Western Canada geese, which are currently above population objectives in the Pacific Flyway. Less than 100 ducks and geese per year are estimated to be taken under the refuge waterfowl hunts. Hunting would not have a significant impact on local, regional, or Pacific Flyway waterfowl populations because the percentage taken on the refuge, though possibly additive to existing hunting take, would measure a fraction of a percent of the estimated duck and goose populations. Dusky Canada geese are not expected to be impacted by the harvest as they would not yet have arrived on their wintering grounds during the season of this hunt. In addition to direct mortality, hunting could result in some redistribution of Western Canada geese at Baskett Slough Refuge due to disturbance.
Effects to non-target species	Potential minor disturbance to other foraging or resting birds from dogs, human activity, and noise associated with hunting. Hunter education courses are required by ODFW for youths. Orientation would be provided to all duck and goose hunters before the start of each hunting day. These measures would help to reduce effects to non-target species. At this time, dusky Canada geese would not be impacted as they arrive later in the fall. If dusky arrival time shifted to earlier in the fall, these hunts would be re-evaluated.

Effects to refuge habitats	Effects confined to wetland and cropland habitat types. Approximately 29-34% of Baskett Slough Refuge would be open to hunting during the specified seasons (6 days/year). Negligible effect expected to vegetation from trampling, because of the low number of users and days of use expected. Some potential conflicts with the cooperative farming program at Baskett Slough could occur but would be minimized by limiting waterfowl hunting to the 6 days mentioned above.
Effects to listed species	Negligible impact; potential for minor trampling but any listed plants in the area will have senesced by the start of the season. No impact to Fender's blue butterfly habitat.
Effects to other priority public uses	Minor effects to other users because of the short season. Minor potential for a perception of favoritism for one user group over another, because other users are not allowed into the Baskett Slough wetlands at any time. However, providing opportunities for youth is an important initiative in the Fish and Wildlife Service and helps address a public desire to see more hunting opportunities for youth.

The Service believes that hunting on the Baskett Slough National Wildlife Refuge will not have a significant impact on local, regional, or Pacific Flyway waterfowl populations because the percentage likely to be taken on the Refuge, though possibly additive to existing hunting takes, would be a tiny fraction of the estimated populations. In addition, overall populations will continue to be monitored and future harvests will be adjusted as needed under the existing flyway and state regulatory processes.

This hunt would not add to cumulative impacts to waterfowl stemming from hunting on national wildlife refuges. Several points support this conclusion: 1) the proportion of the national waterfowl harvest that occurs on National Wildlife Refuges is only 6 percent (US DOI 2009); 2) there are no waterfowl populations that exist wholly and exclusively on national wildlife refuges; 3) annual hunting regulations within the United States are established at levels consistent with the current population status; 4) Refuges cannot permit more liberal seasons than provided for in Federal frameworks; and 5) Refuges purchased with funds derived from the Federal Duck Stamp must limit hunting to 40 percent of the available area.

Despite the direct and indirect impacts associated with sport hunting waterfowl, waterfowl populations are unlikely to be affected significantly by the hunting program on Baskett Slough Refuge. Waterfowl population objectives and allowable harvests are determined on a flyway basis utilizing an established annual regulatory process as described in above. Limited hunt seasons at Baskett Slough, no hunt zones, and established winter sanctuary on the majority of the acreage for the Willamette Valley Refuges ensure that wintering and migrating waterfowl, as well as non-target species, will find adequate food and rest areas on the Refuges even in the midst of the hunting season. Thus, allowing waterfowl hunting under the stipulations described above will not materially detract or interfere with the purposes for which the refuge was established or the refuge mission.

Cumulative Effects

Council on Environmental Quality (CEQ) regulations, which implement the provisions of NEPA, define several different types of effects that should be evaluated in an environmental document, including direct, indirect, and cumulative effects (40 CFR § 1508.7). Direct and indirect effects are addressed in the resource-specific section above. This section addresses cumulative effects.

According to the CEQ, cumulative effects can result from the incremental effects of a project when added to other past, present, and reasonably foreseeable future projects in the area, regardless of the entity undertaking the action. Cumulative impacts can result from individually minor but cumulatively significant actions over a period of time. This analysis is intended to consider the interaction of hunting activities at W.L. Finley Refuge and with other actions occurring over a larger spatial and temporal frame of reference.

It should be noted that a robust cumulative effects analysis was included in the CCP/EA by virtue of the comprehensive nature by which the direct and indirect effects associated with implementing the various CCP alternatives were presented in the environmental consequences chapter of the CCP/EA the various Compatibility Determinations (CCP/EA, Appendix C).

Effects to waterfowl at the local (refuge scale) and flyway scale have already been addressed above. Thus the analysis in this section primarily focuses on effects associated with reasonably foreseeable future events and/or actions regardless of what entity undertakes that action in relation to waterfowl hunting at Baskett Slough Refuge.

Effects from Reasonably Foreseeable Future Refuge Activities

Under the CCP, there is greater potential for more benefit to conservation of native species of the Willamette Valley and to recreational users, because the Service would develop a land protection plan. This plan could provide for further protection and restoration of habitats outside the current refuge area via easements, acquisition, cooperative agreement, and/or other means for further protection and restoration of native habitats that may presently, or could in the future support rare species. Such additional lands may eventually be opened to public use, providing direct opportunity for enjoyment of nature and wildlife. However, even if they are never opened to the public, managing additional lands for conservation values would increase and support native species populations in the Willamette Valley, indirectly benefiting consumptive and non-consumptive recreationists.

Other Reasonably Foreseeable Events and Activities

Climate Change: Warming, whether it results from anthropogenic or natural sources, is expected to affect a variety of natural processes and associated resources. However, the complexity of ecological systems means that there is a tremendous amount of uncertainty about the impact climate change will actually have. In particular, the localized effects of climate change are still a matter of much debate. That said, the combination of increased frequency and severity of drought in the basin and increased frequency of wildlife could dramatically reduce the amount and quality of waterfowl habitat in the basin. As a result waterfowl would be forced into smaller and smaller amounts of available habitat. Concentrating birds into smaller and smaller areas also has the potential to more readily allow disease to spread within overwintering waterfowl populations resulting in increased bird mortality.

Development and population growth: By 2050, an additional 1.7 million people are expected to live in the Willamette River Basin, bringing the total population to around four million (Willamette Basin Explorer 2009), equivalent to adding three more cities the size of Portland or 13 cities the size of Eugene. This population growth will continue to place stress upon the ecosystems of the Willamette Valley, both through direct loss of remaining habitats, and indirectly through fragmentation and degradation of the Valley's remaining parcels of wildlife habitat and demands on water. Refuge

management can do nothing to stem this trend but refuges and other tracts of habitats will become even more important as repositories of biodiversity. Development and population growth are the events which are most likely to affect waterfowl. The continuing loss of wetland habitat to urbanization over time will result in smaller numbers of duck and swans in the Willamette Valley. Loss of agricultural lands may further concentrate overwintering geese on pastures and crop lands further exacerbating agricultural depredation. Concentrating birds into smaller and smaller areas also has the potential to more readily allow the disease spread within overwintering goose populations resulting in increased bird mortality. Changing demographics and changes in public tastes for outdoor recreation suggest public participation in waterfowl hunting will also decline (USFWS 2007).

References

Altman, B. 2011. Historical and Current Distribution and Populations of Bird Species in Prairie-Oak Habitats in the Pacific Northwest. Northwest Science, 85(2):194-222.

Carver, E., and Caudill, J. 2007. Banking on nature 2006—The economic benefits to local communities of National Wildlife Refuge visitation: U.S. Fish and Wildlife Service, Division of Economics, Washington, D.C., accessed September 2008, at http://www.fws.gov/refuges/about/msWord/BankingonNature_2006_11-23.doc

Climate Impacts Group. 2008. Climate Change Scenarios. Joint Institute for the Study of the Atmosphere and Ocean (JISAO) Center for Science in the Earth System (CSES), University of Washington. http://cses.washington.edu/cig/fpt/ccscenarios.shtml

Gedalof Z., Peterson D.L., and Mantua N.J. 2005. Atmospheric, climatic, and ecological controls on extreme wildfire years in the Northwestern United States. Ecological Applications. 15:154-174.

Hammond, Paul. 2007. The 2007 study of the Fender's blue butterfly (*Icaricia icariodes fenderi*) in Benton, Polk, and Yamhill Counties, Oregon. Unpublished report to the Nature Conservancy and U.S. Fish and Wildlife Service.

Hoopes E.M. 1993. Relationships between human recreation and piping plover foraging ecology and chick survival. MS Thesis, University of Massachusetts, Amherst, Massachusetts, 106 pp.

Janzen, F. 1994. Climate change and temperature-dependent sex determination in reptiles. Proc. Nati. Acad. Sci. 91: 7487-7490.

Keller, V.E. 1991. Effects of human disturbance on eider ducklings Somateria mollissima in an estuarine habitat in Scotland. Biological Conservation 58:213-228.

Korschgen, C.E. and Dahlgren, R.B. 1992. Human disturbances of waterfowl: Causes, effects, and management. Fish and Wildlife Leaflet 13.2.15. 8 pp.

Lawler, J.J., M. Mathias, A. Yahnke, and E. Girvetz. 2008. Oregon's biodiversity in a changing climate. Report prepared for the Climate Leadership Initiative, University of Oregon.

MacArthur, R.A., V. Geist, and R.H. Johnston. 1982. Cardiac and behavioral responses of mountain sheep to human disturbance. J. Wildl. Manage. 46:351-358. C.W. Servheen, eds. 1980. Proceedings of the Washington bald eagle symposium; Seattle, Washington.

McAllister, K.R. and W.P. Leonard. 1997. Washington State status report for the Oregon Spotted Frog. Washington Department of Fish and Wildlife, Olympia, Washington. 38 pp.

Moore, R. 2008. Distribution and abundance of Streaked horned larks on the mid-Willamette Valley National Wildlife Refuge Complex, breeding season 2008. Unpublished report to the U.S. Fish and Wildlife Service, Willamette Valley National Wildlife Refuge Complex. Corvallis, Oregon.

Murphy, M.S. 2008. Edaphic controls over succession in former oak savanna, Willamette Valley, Oregon. Master's Thesis, Environmental Studies Program, University of Oregon, Eugene, OR.

Raftovich, R.V., K.A. Wilkins, K.D. Richkus, S.S. Williams, and H.L. Spriggs. 2009. Migratory bird hunting activity and harvest during the 2007 and 2008 hunting seasons. U.S. Fish and Wildlife Service, Laurel, Maryland, USA.

Sime, C.A. 1999. Domestic Dogs in Wildlife Habitats. Ch 8 in Effects of Recreation on Rocky Mountain Wildlife: A Review for Montana. Montana Chapter of the Wildlife Society:Missoula, MT. 17 pp.

Stinson, D.W. 2005. Draft Washington State Status Report for the Mazama Pocket Gopher, Streaked Horned Lark, and Taylor's Checkerspot. Washington Department of Fish and Wildlife, Olympia.138+ xii pp.

Subcommittee on Pacific Population of Western Canada Geese. 2000. Pacific Flyway Management Plan for the Pacific Population of Western Canada Geese. Pacific Flyway Study Committee. (c/o USFWS, MBMO) Portland, Oregon. Unpubl. rept.

Trost and Sanders. 2008. 2008 Pacific Flyway Data Book: Waterfowl Harvests and Status, Hunter Participation and Success in the Pacific Flyway and United States. U.S. Fish and Wildlife Service, Division of Migratory Bird Management:Portland, OR. 120 pp.

U.S. DOI. 2009. Draft Supplemental Environmental Impact Statement: Issuance of Annual Regulations Permitting the Hunting of Migratory Birds. U.S. Fish and Wildlife Service, Department of Migratory Bird Management. Portland, Oregon.

U.S. Fish and Wildlife Service. 2007. 2006 National Survey of Fishing, Hunting and Wildlife-Associated Recreation: National Overview, Preliminary Findings, May 2007.

U.S. Fish and Wildlife Service. 2008. 2006 National Survey of Fishing, Hunting, and Wildlife Associated Recreation.

U.S. Fish and Wildlife Service. 2010a. Recovery Plan for the Prairie Species of Western Oregon and Southwestern Washington. U.S. Fish and Wildlife Service, Portland, Oregon. Xi + 241 pp.

U.S. Fish and Wildlife Service. 2010b. 2010 Willamette Valley Winter Waterfowl Survey. Willamette Valley National Wildlife Refuge Complex. Corvallis, Oregon. Unpublished report.

Westerling A.L., H.G. Hidalgo, D.R. Cayan, and T.W. Swetnam. 2006. Warming and Earlier Spring Increase Western U.S. Forest Wildfire Activity. Science 313: 940-943.

Willamette Restoration Initiative. 2004. Draft Willamette Subbasin Plan. Prepared for the Northwest Power and Conservation Council. Primozich, D., Project coordinator and R. Bastasch, Executive director. http://www.nwcouncil.org/fw/subbasinplanning/willamette/plan/

Appendix 1 - Maps

Map 1 - ***Willamette Valley NWRC Local Area***
Map 2 – ***Baskett Slough NWR Hunt Plan***
Map 3 – ***Baskett Slough NWR Habitat Alternatives Assessed in CCP/EA***